

3 Instructions for Calculating and Reporting Project Justification Information

This section provides instructions on the calculation and reporting of information addressing the New Starts project justification criteria (Mobility Improvements, Environmental Benefits, Operating Efficiencies, Cost Effectiveness, Transit Supportive Existing Land Use and Future Patterns and Other Factors). A standard format is applied for each of the reporting requirements and provides detailed instructions and worksheets to guide local agencies through the calculation and reporting of each measure.

The application and documentation of consistent measures, data inputs, and analytical assumptions as outlined in these instructions will improve the quality of the information reported and will support FTA's decision making process. The New Starts Project Justification Criteria are as follows:

- **Mobility Improvements** measured by travel time savings, number of low income households served, and employment near stations;
- **Environmental Benefits** measured by change in regional pollutant emissions, change in regional energy consumption and EPA air quality designation;
- **Operating Efficiencies** measured by operating cost per passenger mile;
- **Cost Effectiveness** expressed as transportation system user benefits divided by incremental cost (projects that are already well into preliminary engineering will be allowed to continue using the incremental cost per incremental passenger measure); and
- **Transit Supportive Existing Land Use, Policies, and Future Patterns** measured by combined rating on several factors.

Most of the data inputs and qualitative assessments required to calculate or address each of these measures should be readily available as a result of an alternatives analysis and other planning/project development analyses completed or underway. The FTA Office of Planning and Regional Offices will work with local agencies to address questions and issues regarding individual data items and reporting of specific information and measures.

3.1 Mobility Improvements

Three measures are applied to estimate mobility improvements: travel time savings, number of low income households served, and number of jobs near stations. These measures are rated according to the New Starts criteria and combined into a general "Mobility Improvements" rating.

3.1.1 Annual Travel Time Savings

Change Due to Major Capital Investment Projects Final Rule

Total annual travel time savings will be calculated using the methods developed to estimate transportation system user benefits. The user benefit calculation expressed in time equivalent units (hours) will serve as the travel time savings estimate in the mobility measure. The calculation of transportation user benefits produces a multi-modal measure of traveler utility for all users of the transportation system, which can be expressed in terms of travel time savings.

Implementing the new measure will generally require some changes to regional travel demand models to ensure that the information needed to calculate user benefits is saved as a model output. To smooth the transition to this new measure, FTA has consultants under contract to directly perform the travel demand model modifications necessary to report the user benefit measure. FTA staff and project sponsors need to coordinate the implementation of the new user benefit measure for specific projects. If this coordination has not already occurred, project sponsors are encouraged to contact their FTA Regional Office.

Beginning in the summer of 2001, FTA will distribute a software tool for analysing travel demand model results called SUMMIT. One of the main features of this product will be to facilitate the calculation and reporting of the user benefit measure. After completing the model modifications described above, a set of files will be produced by the regional travel demand model which may be read into the SUMMIT software. SUMMIT will automatically perform the calculations necessary to report the user benefit measure. Detailed documentation of the methodology and implementation process will be provided by FTA, beginning in the summer of 2001. After the project sponsor's regional travel demand model has been modified and the SUMMIT software is in hand, the following steps and templates are required to report annual travel time savings.

3.1.1.1 Key Assumptions and Data Sources

- The forecast year is the planning horizon year, 20 years in the future;
- The study area consists of the region modeled for travel demand purposes;
- Travel time savings are calculated by subtracting the transportation system user expenditures in hours in the New Starts baseline alternative from the New Starts build alternative;
- Transportation system user benefits (expenditure savings in hours) is produced by the SUMMIT travel demand reporting program using files created by the travel demand model used to forecast ridership for the New Starts baseline and build alternatives.

Travel time savings reported in this measure for the New Starts build alternative should only reflect savings as a direct result of the Section 5309 New Starts fixed guideway and related transit investments included in the Build alternative. Travel time savings that would result from HOV or other roadway improvements that may be included in the full build alternative or multi-modal investment strategy but not proposed for Section 5309 New Starts funds should not be reported in this measure.

3.1.1.2 Calculation and Reporting Methods

Table 3-1 illustrates the data and steps needed for calculation, documentation, and reporting of this measure. Template 3 in Appendix A must be completed to report this information. Agencies that have difficulty developing the user benefit estimate using SUMMIT may contact FTA, Office of Planning to receive additional guidance and support to calculate this measure.

Step 1: Run modified travel demand model for the New Starts baseline and build alternatives. The modified travel demand model will automatically launch SUMMIT and use the trip tables and generalized cost files produced by the travel demand software, and estimate user benefits of the New Starts build alternative relative to the New Starts baseline.

Step 2: Locate the SUMMIT report file and report calculations for change in user expenditures in equivalent hours between the baseline and New Starts build alternatives in Line 1 of Template 3. All project sponsors must also submit an electronic copy of the SUMMIT report file created for the user benefit analysis.

Step 3: Report annualization factor in the template and calculate the annual savings in user expenditures in travel time equivalent units (hours). Annualization factors convert weekday estimates to annual estimates. Any annualization factor over 300 must be accompanied by documentation proving that the annualization factor is correct.

Table 3-1: Travel Time Savings Data Sheet

Line	Variable	Value	Source/Calculation
1	Weekday User Benefits (User Expenditure Savings in Hours), New Starts baseline vs. build	6,000	Source: Output from SUMMIT travel demand evaluation software for change in User Expenditures between the New Starts baseline and build alternatives.
2	Annualization Factor	280	Source: Value that converts daily estimates to annual estimates.
3	Total Annual Travel Time Savings	1,680,000	Calculation: Multiply change in weekday User Expenditures in Hours (Line 1) by annualization factor (Line 2).

Helpful Hints for Travel Time Savings:

1. Use an annualization factor that reflects current levels of transit service.
2. Do not assume that the annualization factor will exceed 300 if the current levels of transit service on weekends are limited or non-existent. FTA staff will request documentation justifying use of annualization factors in excess of 300.
3. Long distance commuter services, such as commuter rail lines and long distance bus projects, should not have an annualization factor reflecting non-weekday service unless there are current weekend riders on existing transit modes.

3.1.2 Low Income Households Served

This measure is defined as the estimated number of low income households served by the Section 5309 New Starts investment. This mobility improvement measure is reported as the estimated number of low income households (defined as households below the poverty level)

located within ½ mile of boarding points (transit stations) located directly on the proposed New Starts project. Low income households are reported as an absolute number in the current reporting year, and no comparisons are made to the New Starts baseline. FTA requests that local agencies also report the total number of households within ½ mile of boarding points.

3.1.2.1 Key Assumptions and Data Sources

Low income households reported in this measure are defined by the U.S. Census of Population to include households with “income below the poverty level.” (See Appendix C.)

- Data reported are to reflect the most recent information available through the U.S. Census or other reliable local sources. Data are not to be reported for the forecast year nor should they reflect any analyses of projected conditions.
- Local agencies may have different data sources and analysis/reporting tools available to estimate this measure. The use of geographic information system (GIS) tools should greatly assist in this estimation. Locally applied travel demand models and land use models may include data on household income that could be analyzed and reported to estimate this measure. If these data are not readily available, the U.S. Census of Population data at the tract and/or block level should be applied directly.
- Avoid double-counting of households for stations that are less than 1 mile apart. This can be done in two ways: (a) draw a line dividing the area enclosed by the overlapping circles into two parts; or, (b) group stations that are less than 1 mile apart into clusters and report total data for each cluster (as shown for Stations A and B in Appendix B. In either case, please report the total land area encompassed by the overlapping circles. (Total land area for individual stations not grouped together is the area enclosed by a circle of ½-mile radius, i.e., $3.1415 \times (0.5)^2 = 0.785$ sq. mi.)

3.1.2.2 Calculation and Reporting Method

The reporting format provided in Table 3-2 illustrates the data and steps needed for calculation, documentation, and reporting of this measure, and should be completed and submitted by local agencies. Template 4 in Appendix A is provided for reporting this measure.

Step 1: Identify an analysis zone of 1/2 mile radius around the New Starts project’s boarding points, defined as the transit stations located directly on the New Starts transit facility.

Step 2: Applying the best available local data sources and analytical tools, estimate the number of low income households and total number of households within the 1/2 mile radius analysis zones identified in Step 1. These data are to be reported as illustrated in Table 3-2. If available, GIS and other analytical tools will assist local agencies in estimating this measure. If such tools are not available, and for instances where a census tract or block is only partially located within a designated 1/2 mile radius zone, households within the zone should be factored based on the estimated percentage of the tract or block within the analysis zone as illustrated in Table 3-2.

Step 3: Additional documentation and background information including maps illustrating the transit system, the New Starts boarding points, and Census tracts should be assembled and attached.

Helpful Hints for Low Income Households:

1. Make sure that the number of stations shown in the Low Income Households Template is the same as the number of stations shown in the project description worksheet.
2. Only those low-income households within ½ mile of the station areas of the proposed project should be counted. This does not include existing stations or other feeder bus service areas.

Table 3-2: Mobility Improvements: Low Income Households Sample Calculation and Reporting

Census Tract	Number of Total Households	Number of Low-Income Households	Fraction of Tract within 1/2 mi. of New Starts Project Boarding Points	Number of Total HH's within 1/2 Mile of Boarding Points	Number of Low-Inc. HH's within 1/2 Mile of Boarding Points
For each station on New Starts Facility					
Station 1					
1001	5	2	1.00	5	2
1002.01	252	64	1.00	252	64
1002.03	70	20	0.60	42	12
1003	125	14	0.20	25	3
Subtotal	452	100		324	81
Station 2					
1025	45	15	0.75	34	11
1026	135	24	0.80	108	19
1027	400	100	1.00	400	100
Subtotal	580	139		542	130
Station 3, etc.					
1030.01	550	54	0.10	55	5
1030.02	426	11	0.25	107	3
1041	125	14	1.00	125	14
1042	65	20	0.80	52	16
Subtotal	1,166	99		339	38
Total for All Boarding Points	2198	338		1204	249

Note:
Attach map showing census tracts and transit system

Source:
U.S. Census Data:
Total Households

Source:
U.S. Census Data: Households with "income below poverty level"

Source:
GIS or visual estimation

Calculation:
Number of Total Households * Fraction within 1/2 mile

Calculation:
Number of Low-Income Households * Fraction within 1/2 mile

3.1.3 Employment Near Stations

Change Due to Major Capital Investment Projects Final Rule

FTA now requires the reporting of an additional measure to supplement the evaluation of mobility improvements. The new measure is number of jobs within ½ mile of the proposed transit stations. The calculation of this measure is approximately the same as the low-income household measure, but using employment estimates by traffic analysis zones developed for use in travel demand models.

This measure is defined as the estimated number of jobs accessible from the Section 5309 New Starts investment. This mobility improvement measure is reported as the estimated number of jobs located within ½ mile of stations located directly on the proposed New Starts transit project. Employment is reported as an absolute number in the current reporting year, and no comparisons are made to the New Starts baseline.

3.1.3.1 Key Assumptions and Data Sources

Employment data that are linked to a geographic area are generally difficult to collect. Census data usually provides the population estimates for each traffic analysis zone (TAZ), but employment figures must be pieced together from a variety of sources such as State Employment Commissions, market research listings, locally developed employment data, aerial photography and other methods. An estimate of employment is included in the TAZ information file used to generate regional travel demand estimates. The employment data used to forecast ridership may be the primary source for developing the employment measure. Many project sponsors have been reporting this information on the land use quantitative information template (Template 12) in past years.

- Local agencies may have different data sources and analysis/reporting tools available to estimate this measure. The use of geographic information system (GIS) tools linked to the regional travel demand model's TAZ structure will greatly simplify the reporting of this measure.
- Avoid double-counting of employment for stations that are less than 1 mile apart. This can be done in two ways: (a) draw a line dividing the area enclosed by the overlapping circles into two parts; or, (b) group stations that are less than 1 mile apart into clusters and report total data for each cluster (as shown for Stations A and B in Appendix B. In either case, please report the total land area encompassed by the overlapping circles. (Total land area for individual stations not grouped together is the area enclosed by a circle of ½-mile radius, i.e., $3.1415 \times (0.5)^2 = 0.785$ sq. mi.)

3.1.3.2 Calculation and Reporting Method

The reporting format provided in Template 5 illustrates the data and steps needed for calculation, documentation, and reporting of this measure, and should be completed and submitted by local agencies.

Step 1: Identify an analysis zone of 1/2 mile radius around the New Starts project's boarding points, defined as the transit stations located directly on the New Starts transit facility.

Step 2: Applying the best available local data sources and analytical tools, estimate the number of jobs within the 1/2 mile radius analysis zones identified in Step 1. If available, GIS and other analytical tools will assist local agencies in estimating this measure. If such tools are not available, and for instances where a TAZ is only partially located within a designated 1/2 mile radius zone, jobs within the zone should be factored based on the estimated percentage of the tract or block within the analysis zone.

Step 3: Additional documentation and background information including maps illustrating the transit system, the New Starts project's boarding points, and traffic analysis zones should be assembled and attached.

3.2 Environmental Benefits

Three measures are applied to estimate environmental benefits:

- Change in criteria pollutant and precursor emissions and greenhouse gas emissions;
- Change in regional energy consumption in the forecast year; and
- Current regional air quality designation by the Environmental Protection Agency (EPA).

3.2.1 *Change in Criteria Pollutant/Precursor Emissions, Greenhouse Gas Emissions, and Energy Consumption*

Change in criteria pollutant and precursor emissions is expressed as the annual number of tons of emissions forecast for the region, comparing conditions under the Section 5309 New Starts investment to the New Starts baseline alternative. Criteria pollutant and precursor emissions measured include carbon monoxide (CO), particulate matter (PM₁₀), nitrogen oxides (NO_x), and volatile organic compounds (VOC), the latter two being precursors of ozone. The greenhouse gas emission measured is carbon dioxide (CO₂). This year, the templates used to report the environmental benefits measures have been consolidated onto a single template to simplify the reporting of environmental benefits and reduce errors.

Change in regional energy consumption in the forecast year is measured in British Thermal Units (BTUs), comparing the New Starts investment to the New Starts baseline alternative. This measure reflects the net impact on energy savings as a result of changes in automobile and commercial travel in the region, offset in part by the energy requirements for operation of the proposed transit investment. Note that this measure reports BTU consumption for transportation operations (transit, auto, and commercial) only, and does not consider energy consumed for construction, equipment manufacturing, and heavy maintenance activities. FTA calculates this measure based on VMT estimates from the regional travel demand model and standard energy consumption rates for available fuel types as reported in the *Transportation Energy Data Book, Edition 16*, Oak Ridge National Laboratory, as shown in Table 3-3.

3.2.1.1 Key Assumptions and Data Sources

- The forecast year is the horizon year of the 20-year analysis period.
- The vehicle miles traveled (VMT) data is estimated in the regional travel demand model and from bus and rail system operating plans.
- The study area consists of the regional transportation network modeled for air quality and travel demand purposes.
- Changes in VMT reported in this measure for the New Starts build alternative should only reflect changes as a direct result of the Section 5309 New Starts fixed guideway and related transit investments in the Build alternative. Changes in VMT should not be reported in this measure for HOV or other improvements that may be included in the full definition of the Build alternative or multi-modal investment strategy, but not proposed for New Starts funds.
- The criteria pollutant and precursor emissions measured include CO, NO_x, VOC, and PM₁₀. Emissions data for criteria pollutants are typically produced as part of the air quality analysis conducted for alternative analyses and NEPA environmental analyses,

linking outputs from the regional travel demand model with emission factors from accepted emission models (e.g., EPA's MOBILE model for estimating highway vehicle emission factors) to provide an overall estimate of emissions for the transportation network. Calculation and reporting procedures are outlined below.

- Regional energy consumption in BTU's is based on estimated change in VMT discussed previously multiplied by standard energy consumption factors for each fuel type.
- The greenhouse gas emissions are calculated from the BTU estimates developed for the energy consumption estimate and multiplied by standard tons CO₂/million BTU conversion factors provided in the template.

3.2.1.2 Calculation and Reporting Method

Table 3-3 illustrates the data needed for FTA to calculate emissions changes due to the proposed New Starts project. The following table (also Template 6 in Appendix A) must be completed and submitted by local agencies.

Step 1: Millions of VMT in the region for the forecast year are estimated by vehicle classification for the New Starts baseline and New Starts build alternative, using the regional travel demand model. The model applies average speed of travel on regional roadways based on locally observed conditions. These values are applied as inputs to accepted regional emissions estimation models (such as EPA's MOBILE and PART5 software) to generate emissions factors.

Step 2: Emission factors are applied to annual regional VMT by vehicle classification to estimate annual tons of CO, NO_x, VOC, and PM₁₀ for the New Starts baseline and build alternatives. Locomotive emissions factors for the diesel commuter rail vehicle classification are provided in the template. Millions of VMT is converted to VMT by multiplying by 1,000,000. Total VMT is then multiplied by the emissions factor and divided by 909,000 to convert units from grams to tons. The results of these calculations in tons are summed across all vehicle classifications and reported as totals for the New Starts baseline and build alternatives.

Step 3: The differences in the total annual tons of emissions are calculated and reported for CO, NO_x, VOC, and PM₁₀, comparing the New Starts build alternative to the New Starts baseline.

Step 4: Factors and procedures for estimating BTU consumption by vehicle/fuel type for the forecast year are presented in Table 3-3. In these procedures, passenger vehicles (autos and light duty trucks) are assumed as gasoline powered, and various fuel types of transit vehicles are considered, including diesel, compressed natural gas (CNG), and electricity. Until better data becomes available, assume diesel bus BTU efficiency factors for alternative fuel buses.

Step 5: Change in annual BTU consumption, comparing the New Starts build alternative to the New Starts baseline, is calculated by multiplying the change in VMT by the energy consumption factor to derive change in regional energy consumption in millions of BTU's.

Step 6: Change in emissions of greenhouse gasses (CO₂) are calculated by multiplying the change in annual energy consumption in millions of BTU's by the CO₂ emissions conversion factors (tons CO₂/million BTU).

Table 3-3: Environmental Benefits Template

Vehicle Class	Regional VMT/year (millions)		Emission Factor (g/mi)				Annual Emissions (tons)								Change in Emissions (tons per year)				Energy Consumption	Change in BTU/year (millions)	CO2 Consumption	Change in CO2 Emissions/year	
	New Starts Baseline	New Starts Project					New Starts Baseline				New Starts Project				Project vs. Baseline				(BTU/Veh-mile)	New Starts Project vs. New Starts Baseline	(Tons CO2/ Million BTU)	New Starts Project vs. New Starts Baseline	
			CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10					
Passenger Veh. (LDV/LDT)																			6233		0.0765		
Heavy-Duty Vehicle																			22046		0.0788		
Bus/Diesel																			41655		0.0788		
Bus/CNG																			41655		0.0585		
Bus/LPG																			41655		0.0678		
Bus/M85 or E85																			41655		0.0765		
Bus Electric																			41655		0.0665		
Light or Heavy Rail/Electric																			77739		0.0665		
Commuter Rail/Diesel			7.48	22.43	202.04	5.08													100000		0.0788		
Commuter Rail/Electric																			100000		0.0665		
Total																							

Note:
Private vehicle classes should be consistent with regional travel model -- examples are shown here.

Source:
- Private vehicles from regional travel demand model
- Bus and rail from system operating plans

Source:
- Private vehicles from MOBILE or EMFAC
- Diesel bus from MOBILE HDDV
- Alt. fuel buses from diesel EF's and conversion factors given in text
--Rail calculated emission rates and fuel consumption rates as follows:
CO – 10.4 g/gal x .719 gal/mi = 7.48
Nox – 31.2 g/gal x .719 gal/mi = 22.43
VOC – 281 g/gal x .719 gal/mi = 281
PM-10 – 7.07 g/gal x .719 gal/mi = 5.08
If using a diesel locomotive with higher efficiency, project specific rail emission factors may be calculated (provide documentation).

Calculation:
Annual Emissions = VMT * 1,000,000 *
Emission Factor / 909,000 g/ton

Calculation:
Change in Emissions =
New Start Emissions -
Baseline Emissions

Source:
Transportation Energy Data Book Edition 16
Note:
Transit agencies may provide their own estimates for transit vehicle BTU/mi factors(provide documentation)

Calculation:
= Change in VMT/year * BTU/veh-mi

Source:
Calculations by Cambridge Systematics, Inc. based on Energy Information Administration (1996) and Delucchi (1996).

Calculation:
= Change in BTU/year * Tons CO2/million BTU

3.2.2 *Current EPA Regional Air Quality Designation*

This measure is defined as the U.S. Environmental Protection Agency's (EPA's) current air quality designation for the region, reflecting current compliance with the National Ambient Air Quality Standards (NAAQS). The measure simply reports the EPA designation for the region in terms of attainment, non-attainment, or maintenance for transportation-related pollutants including ozone, carbon monoxide, particulate matter, and nitrogen oxides. Areas in non-attainment are further classified in terms of "extreme," "severe," "serious," "moderate," "marginal," or simply "non-attainment." Areas may also be classified as "transitional" (i.e., less than three years of complete data), or as "ozone maintenance areas" (previously non-attainment) which may further be classified as "moderate," "marginal," or "sub-marginal."

3.2.2.1 **Calculation and Reporting Method**

The EPA publishes a list, the "Green Book", that designates each area's current status relative to the attainment of the NAAQS. Project sponsors must report the region's air quality designation from EPA's most recent "Green Book" (see Appendix D).

Helpful Hints for Environmental Benefits:

1. *Use the same figures for Vehicle Miles Traveled in each Template.*
2. *Emissions should be calculated for each mode in the Region, regardless of the mode under consideration by the project sponsor.*

3.3 **Operating Efficiencies: Change in Operating Cost per Passenger Mile**

The only measure for the Operating Efficiencies criterion is change in system-wide operating cost per passenger mile in the forecast year, comparing the Section 5309 New Starts investment to the New Starts baseline alternative. This measure, expressed in constant FY2001 dollars, reports the operating cost per passenger mile for the entire regional transit system. FTA requires that this measure also be reported by transit mode (e.g., rail, bus) if applicable and available.

3.3.1.1 **Key Assumptions and Data Sources**

- The forecast year is year 20 of the analysis period.
- This measure reports operating cost per passenger mile reported to three decimal places, comparing the New Starts project to the New Starts baseline alternative, for operation of the entire transit system. In addition, FTA requests that this measure also be reported by transit mode (e.g., rail, bus) if applicable.
- System-wide, service area, and route level operating cost data (and factors) are typically available as part of ongoing operations planning. Forecast year estimates of operating costs for the New Starts baseline and build alternatives are included in the financial feasibility analyses completed as part of the New Starts planning and project development process.
- System-wide, service area, and route level passenger miles data for the forecast year are available from a combination of sources including the regional demand estimation model and the local agencies' ongoing operations and service planning databases.

3.3.1.2 **Calculation and Reporting Method**

The worksheet, Table 3-4, illustrates the data and steps needed for calculation, documentation, and reporting of this measure, and should be completed and submitted by local agencies.

Template 7 in Appendix A is provided for reporting this measure.

Step 1: Applying the best available local data sources, report the forecast year annual operating cost and annual passenger miles for the New Starts baseline and build alternatives for the entire transit system, and by transit mode if applicable, as illustrated Table 3-4;

Step 2: Calculate operating cost per passenger mile in the forecast year for the New Starts baseline and build alternatives for the entire transit system and for each mode.

Step 3: Additional documentation and background information as requested on the template.

Helpful Hints for Operating Efficiencies:

- 1) *The transit system Annual Operating Cost should be equal to the Cost Effectiveness Index Systemwide Annual Operating Cost.*
- 2) *If there is a change of greater than 5 cents, please provide an explanation. Typically, there should be a small change in the System-wide Operating Cost per Passenger if calculated correctly.*

Table 3-4: Operating Efficiencies: Change in Operating Cost per Passenger Mile

Line	Factor	Alternative		New Starts Build vs. Baseline	Source/Calculation
		New Starts Baseline	New Starts Build		
1	System Annual Operating Cost (millions)	\$ 165.0	\$ 190.0		Source: Transit system operating costs, current and projected
2	System Annual Passenger-Miles (millions)	474	555		Source: Forecast system passenger-miles from regional travel model or other ridership projection model
3	Cost per Passenger-Mile (\$/mi)	\$ 0.348	\$ 0.342	\$ (0.006)	Calculation: Annual Operating Cost / Annual Passenger-Miles (Line 1/ Line 2)

3.4 Cost Effectiveness

Until notified by FTA, project sponsors must submit two measures of cost effectiveness. The first, introduced this year in the New Starts Final Rule, is defined as incremental cost divided by transportation system user benefits. The second measure is defined as incremental cost per incremental passenger. The new transportation system user benefits measure is being phased in to ultimately replace the “incremental cost per incremental passenger” measure.

Change Due to Major Capital Investment Projects Final Rule

3.4.1 Incremental Cost Divided by Transportation System User Benefits

FTA has changed the cost-effectiveness index for projects entering or in the New Starts pipeline. The new measure will be incremental cost divided by transportation system user benefits. The inputs to calculate this measure are produced as a matter of course in the development of travel demand forecasts for the proposed project. **The new cost-effectiveness measure will be phased**

in as quickly as possible during 2001. In the meantime, all project sponsors should continue to submit the previous incremental cost per incremental trip measure.

The user benefit calculation expressed in time equivalent units (hours) will serve as the denominator of the cost-effectiveness measure. The numerator is annualized capital and operating costs, resulting in a cost effectiveness measure of the form \$ per hour of transportation system user benefits.

Implementing the new measure will require some changes to regional travel demand models to ensure that the information needed to calculate user benefits is saved as a model output. To smooth the transition to this new measure, FTA has consultants under contract to directly perform the travel demand model modifications necessary to report the user benefit measure. FTA staff and project sponsors need to coordinate the implementation of the new user benefit measure for specific projects. If this coordination has not already occurred, project sponsors are encouraged to contact their FTA Regional Office.

In addition, FTA will distribute in the summer of 2001, a software tool called SUMMIT for analyzing and reporting travel demand model results. One of the features of this product will be to automatically calculate and report the user benefit measure. After completing the model modifications described above, a set of trip tables and generalized cost files will be produced by the regional travel demand model, which will be processed by SUMMIT. The SUMMIT software, with some additional parameter inputs, will automatically perform the calculations necessary to report the user benefit measure. Detailed documentation of the methodology and implementation process will be provided by FTA in the summer of 2001. After the project sponsor's regional travel demand model has been modified and the SUMMIT software is in hand, the following steps and templates are required to report the new cost-effectiveness measure.

3.4.1.1 Key Assumptions and Data Sources

- The forecast year is year 20 of the analysis period.
- Annualized cost is based on constant base-year capital and operating/ maintenance cost estimates developed as part of the New Starts planning and project development process. The latest available data should be applied in the calculation, and documentation of these inputs should be provided.
- Capital costs are to be annualized for input to the calculation of cost effectiveness index based on FTA's assumptions on the useful life of specific cost components and an established discount, illustrate the data and steps needed for calculating, documenting, and reporting this measure, and shall be completed and submitted by local agencies.
- The study area consists of the region modeled for travel demand purposes;
- Transportation system user benefits in equivalent hours are calculated by subtracting the transportation system user expenditures in hours in the New Starts build alternative from the New Starts baseline;
- The calculation of transportation system user expenditures in hours is produced by the SUMMIT travel demand reporting program using files, produced by running the regional travel demand model, containing the generalized cost of each trip and associated trip tables for each market sector and mode for the New Starts baseline and build alternatives.

Travel time savings reported in this measure for the New Starts build alternative should only reflect savings as a direct result of the New Starts fixed guideway and related transit investments included in the Build alternative. Travel time savings that would result from HOV or other roadway improvements that may be included in the full build alternative or multi-modal investment strategy but not proposed for Section 5309 New Starts funds should not be reported in this measure.

Template 8 and Template 9 in Appendix A are including for reporting this measure.

3.4.1.2 Calculation and Reporting Method

Step 1: Applying the best available data sources, report total capital costs, in constant FY2001 dollars for the New Starts baseline and build alternatives. Total capital costs are annualized based on the annualization factors in *Table 3-7*. The FTA Office of Planning and Regional Offices will work with local agencies to address questions and issues related to this procedure.

Step 2: Applying the best available local data sources, report total annual operating and maintenance costs for the entire transit system under full operating conditions in the forecast year for the New Starts baseline and build alternatives. Local agencies need to attach documentation of the data inputs and factors applied in the estimation of annual O&M costs.

Step 3: The annualized capital costs (Step 1) are added to annual operating and maintenance costs (Step 2) to report the total annualized cost for the New Starts baseline and New Starts build alternatives. The incremental cost for the New Starts project (compared to the New Starts baseline) is calculated and reported by subtracting annualized total costs for the New Starts baseline alternative from the annualized total costs for the New Starts investment.

Step 4: Run the modified travel demand model for the New Starts baseline and build alternatives to produce the files containing the generalized cost of making trips and the associated trip tables for each market sector and mode. These files are created and saved by the travel demand model. SUMMIT will use the information in these files to estimate user benefits of the New Starts project relative to the New Starts baseline.

Step 5: Locate the SUMMIT report file and report calculations for change in user benefits (expenditure savings in equivalent hours) between the New Starts baseline and New Starts build alternatives in Line 4 of Template 9. All project sponsors must also submit an electronic copy of the SUMMIT report file created for the user benefit analysis.

Step 6: Report annualization factor in the template and calculate the annual savings in user expenditures in travel time equivalent units (hours). This value is called transportation system user benefits.

Step 7: If the project sponsor includes off-model trips in the ridership forecasts, estimate user benefits associated with these trips, estimate the proper annualization factors, and enter the information into Template 9. FTA will provide separate guidance for reporting the user benefits of off-model trips in the near future. In the meantime, project sponsors that wish to report benefits associated with off-model trips (such as stadium or special event trips) are encouraged to contact FTA for guidance and approval to make the calculations.

Template 9 should be assembled and attached.

Table 3-5: Cost Effectiveness: Incremental Cost per Change in Transportation System User Benefits in Forecast Year

Line	Variable	Alternative		Change	Annual Factor	Annual Total	Source/Calculation
		New Starts Baseline	New Starts Build				
1	Annualized Capital Cost (current year dollars)	\$15,000,000	\$39,250,000	\$24,250,000			Source: New Starts baseline and build alternatives capital cost estimates; annualized. Include documentation as shown on attached annualized cost worksheet).
2	Total Systemwide Annual Operating and Maintenance Cost (current year dollars)	\$10,000,000	\$7,000,000	\$(3,000,000)			Source: System-wide operating and maintenance cost estimates for New Starts baseline and build alternatives (attach documentation).
3	Total Annualized Cost in Forecast Year (current year dollars)	\$25,000,000	\$46,250,000	\$21,250,000			Calculation: Sum of annualized capital costs (Line 1) and annual O&M (Line 2).
4	Weekday User Expenditure Savings (hours)			6,000	280	1,680,000	Source: Weekday user expenditure savings from SUMMIT travel demand evaluation software. Multiplying the weekday estimate by the Annual factor produces the annual estimate.
5	User Benefits from Off-Model Trips (hours) - Source 1			500	80	40,000	Source: Calculate off-model user benefits. Annual factor is based on number of events for this special trip generator. Attach documentation.
6	User Benefits from Off-Model Trips (hours) - Source 2			1,200	8	9,600	Source: Calculate off-model user benefits. Annual factor is based on number of events for this special trip generator. Attach documentation.
7	User Benefits from Off-Model Trips (hours) - Source 3					--	
8	Incremental User Benefits (hours)					1,729,600	Calculation: Sum annual user benefit estimates (sum Lines 4 thru 7)
9	Cost-Effectiveness - Incremental Cost (\$) / User Benefits (hours)					\$12.29	Calculation: Divide Incremental Annual Cost (Line 7) by Incremental User Benefits (Line 8) for the New Starts build vs. New Starts baseline alternatives.

3.4.2 Incremental Cost per Incremental Passenger in Forecast Year

The second cost effectiveness measure is defined as the incremental cost per incremental passenger in the forecast year. This measure, expressed in constant base year (2001) dollars, is based on the annualized total capital investment (Federal and local funds) and annual operating costs divided by the forecast change in annual transit system ridership measured in **LINKED** trips⁵, comparing the New Starts project to the New Starts baseline. The estimate for annualized cost is the same for both cost effectiveness measures.

The index used to calculate cost-effectiveness measures the incremental cost per incremental passenger attracted to transit as a result of a New Starts investment. It is computed as follows:

⁵ Linked trips refer to trips that begin at the trip origin and end at the final destination. One linked trip could be composed of several unlinked trips such as driving to a park and ride, riding a commuter train, and taking a bus to the final destination is all one linked trip but is made up of three unlinked trips and two transit system boardings.

Equation 3-1: Cost Effectiveness Index

$$\text{Cost Effectiveness Index} = (\Delta \$CAP + \Delta \$O\&M) / \Delta \text{Annual Linked Trips}$$

where the Δ 's represent changes in costs and linked trips resulting from the New Starts investment compared to the New Starts baseline, and

- $\$CAP$ = Total capital costs, annualized over the life of the project;
- $\$O\&M$ = Annualized operating and maintenance costs; and
- Annual Trips = Annual transit ridership, measured in "linked" trips.

3.4.2.1 Key Assumptions and Data Sources

- The forecast year is year 20 of the analysis period.
- All of the data inputs applied in the calculation of this measure (capital and operating/maintenance cost estimates, transit system ridership forecasts) are developed as part of the New Starts planning and project development process. The latest available data should be applied in the calculation, and documentation of these inputs should be provided.
- Capital costs in constant 2001 dollars are estimated and refined for the New Starts baseline and build alternatives during the New Starts planning and project development process (systems planning, alternative analyses, Preliminary Engineering/Environmental Impact Statements). Capital costs are to be annualized for input to the calculation of cost effectiveness index based on FTA's assumptions on the useful life of specific cost components and an established discount rate.⁶
- Annual operating and maintenance costs for the New Starts baseline and the New Starts project's transit elements are also estimated and refined throughout the New Starts planning and project development process. The latest available cost estimates, accurately reflecting the definition of alternatives, should be applied in the calculation.
- Annual transit ridership, measured as "linked" trips, are derived from the travel demand model utilized to analyze the New Starts baseline and New Starts build alternatives in the forecast year in the study area.
- The cost effectiveness index reported in this measure for the New Starts project alternative should only reflect costs and new transit riders as a direct result of the New Starts fixed guideway and related transit investments included in the build alternative.⁷

3.4.2.2 Calculation and Reporting Method

Table 3-6 and Table 3-7 illustrate the data and steps needed for calculating, documenting, and reporting this measure, and shall be completed and submitted by local agencies. Template 8 and Template 10 in Appendix A are including for reporting this measure.

Step 1: Applying the best available data sources, report total capital costs (\$CAP), in current year dollars for the New Starts baseline and New Starts build alternatives. Capital cost for the New Starts baseline alternative include all transit related projects contained in the Regional Long

⁶ Annualization factors are equivalent annual payments at a specific discount rate, r , over the useful life of the investment, n . In keeping with OMB practice, the discount rate is assumed to be 7%. The formula to calculate the annualization factor is $A = r(1+r)^n / (1+r)^n - 1$.

⁷ Cost effectiveness should not be reported for HOV or other roadway improvements which may be included in the full definition of the build alternative or multi-modal investment strategy, but not proposed for Section 5309 New Starts funds. (FTA will allow local agencies to additionally report the cost effectiveness measure reflecting the definition of the build alternative, including HOV and roadway improvements, to reflect the multi-modal nature of the New Starts investment.)

Range Plan. Total capital costs are annualized based on the annualization factors in *Table 3-7*. The FTA Office of Planning and Regional Offices will work with local agencies to address questions and issues related to this procedure.

Step 2: Applying the best available local data sources, report total annual operating and maintenance costs (\$O&M) for the entire transit system under full operating conditions in the forecast year for the New Starts baseline and build alternatives. Local agencies need to attach documentation of the data inputs and factors applied in the estimation of annual O&M costs.

Step 3: The annualized capital costs (Step 1) are added to annual operating and maintenance costs (Step 2) to report the total annualized cost for the New Starts baseline and New Starts build alternatives.

Step 4: Applying the best available forecasts from the regional travel demand model⁸, report total annual transit system ridership in linked trips under full operating conditions in the forecast year for the New Starts baseline and build alternatives. Any locally derived annualization factors applied to convert daily linked trips to annual totals must be reported and documented. Annual forecasts of linked trips are used to estimate the “new riders” applied in the calculation of the index. FTA requires that the measure of new riders applied in this index only reflect incremental linked trips from the introduction of the Section 5309 New Starts transit investment. HOV riders are not included.

Step 5: The incremental cost for the proposed New Starts project is calculated and reported by subtracting annualized total costs for the New Starts baseline alternative from the annualized total costs for the New Starts build alternative.

Step 6: The measure of incremental linked trips for the New Starts project is calculated and reported by subtracting annual linked trips for the New Starts baseline from the annual linked trips for the New Starts build alternative.

Step 7: The value generated in Step 5 (incremental costs) is divided by the value generated in Step 6 (incremental linked trips). The result is the cost effectiveness index of the proposed New Starts project compared to the New Starts baseline alternative.

Step 8: Additional documentation and background information as requested on the reporting format in Template 10 should be assembled and attached.

⁸ Section 2.1.5 outlines assumptions applied in the development of demand estimation forecasts for the Baseline and New Starts alternatives.

Table 3-6: Cost Effectiveness: Incremental Cost per Incremental Passenger

Line	Factor	Alternative		New Starts Project vs. Baseline	Source/Calculation
		New Starts Baseline	New Starts Project		
1	Annualized Capital Cost (constant 2001 dollars)	\$15,000,000	\$39,250,000		Source: New Starts baseline and build alternative capital cost estimate; Include documentation as shown <i>Table 3-7</i> .
2	Total Systemwide Annual Operating and Maintenance Cost (constant 2001 dollars)	\$10,000,000	\$7,000,000		Source: System-wide operating and maintenance cost estimates for New Starts baseline and build alternatives (attach documentation).
3	Total Annualized Cost in Forecast Year (constant 2001 dollars)	\$25,000,000	\$46,250,000		Calculation: Total Cost = Annualized Capital Cost + Annual Operating Cost (Line 1 + Line 2)
4	Total Annual Ridership in Linked Trips (forecast year)	74,000,000	77,000,000		Source: Regional travel demand model (attach documentation of factors to annualize daily ridership, if applicable)
5	Incremental Annualized Cost			\$21,250,000	Calculation: Subtract Total Annualized Costs (Line 3) for the New Starts baseline from New Starts build alternative
6	Incremental Annual Ridership			3,000,000	Calculation: Subtract Total Annual Ridership (Line 4) for the New Starts baseline from New Starts build alternative
7	Cost-Effectiveness (Incremental Cost per New Rider)			\$7.08	Calculation: Divide Incremental Annual Cost (Line 5) by Incremental Annual Ridership (Line 6) for the New Starts baseline from New Starts build alternative

Helpful Hints For Cost Effectiveness:

1. *The project sponsor must provide the Supplemental Annualization worksheet for each alternative.*
2. *The transit system Annual Operating Cost should equal the Operating Efficiencies Systemwide Annual Operating Cost.*
3. *The Total Annual Ridership should equal the total Forecast Systemwide Annual Ridership shown in the Project Description worksheet under “Travel Demand Estimates.”*
4. *The annual new riders (the difference in riders between the New Starts build and New Starts baseline alternatives) should equal the Systemwide Annual New Riders shown in the Project Description worksheet under “Travel Demand Estimates.”*
5. *The New Start Total Annual Ridership, when divided by the annual factor in the Travel Times Savings, should be approximately equal to the average weekday transit system linked trips in the Project Description worksheet under “Travel Demand Estimates.”*
6. *The annualization factor must be the same as the factor used to calculate the travel time savings measure under Mobility Benefits. Do not assume that the annualization factor will exceed 300 if the current levels of transit service on weekends are limited or non-existent. FTA staff will request documentation justifying use of annualization factors in excess of 300.*

Table 3-7: Cost Effectiveness: Calculating Annualized Cost

This Template is Completed for Each Alternative (CIRCLE ONE)					
NEW STARTS BASELINE			NEW STARTS PROJECT		
Item	Units	Useful Life (Years)	Annualization Factor	Total Cost (millions)	Annualized Cost (millions)
Right-of-way	NA	100	0.070	\$41.70	\$2.92
Right-of-way preparation (major grading, etc.)	NA	100	0.070	\$32.50	\$2.28
Structures (#)	10	30	0.081	\$231.00	\$18.71
Trackwork (meters)	13,000	30	0.081	\$40.40	\$3.27
Signals, electrification (meters)	13,000	30	0.081	\$52.60	\$4.26
Pavement, parking lots, grade crossings	NA	20	0.094	\$23.70	\$2.23
Rail vehicles (#)	30	25	0.086	\$64.90	\$5.58
Buses (#)	0	12	0.126	\$-	\$-
Contingencies		Add item-specific contingency to line items			
Engineering, construction management		Allocate proportionally			
Total				\$486.80	\$39.25

3.5 Other Factors

This criterion presents local agencies with an opportunity to provide FTA with information regarding other factors that may contribute to the overall success of the proposed New Starts investment.

Change Due to Major Capital Investment Projects Final Rule

FTA now requires project sponsors report an additional ridership forecast. The additional forecast is the ridership that would result if the proposed system exists in the current year (today). This forecast will help FTA determine how much of the year 20 forecast results from assumed growth. The higher the percentage of year 20 ridership that is attributable to assumed growth, the higher the risk in achieving that forecast. FTA will have more confidence in forecasts that show a greater proportion of forecast trips would occur if the project existed today.

The ridership that would occur today is produced by applying the current year population, employment and highway network and the proposed transit network in the travel demand model and producing the ridership forecast. This forecast is entered on the project description template, Template 1, and evaluated as an “Other Factor” in the New Starts evaluation and rating process.

Project sponsors that are within 5 years of their planned opening year may use opening year ridership rather than the current year forecast.

FTA will also consider additional factors that may contribute to the overall success of the proposed New Starts investment, such as:

- The degree that institutions (local transportation initiatives, parking policies, etc.) are in place as assumed in the forecasts;
- Multi-modal emphasis of the locally preferred investment strategy, including the Section 5309 New Starts project as one element;
- Environmental justice considerations and equity issues;
- Opportunities for increased access to employment for low income persons, and welfare to work initiatives;
- Outstanding or unique public involvement program activities, including private sector and institutional involvement;
- Livable communities initiatives and local economic development initiatives;
- Consideration of alternative land use development scenarios in local evaluation and decision making for the locally preferred transit investment decision; and
- Consideration of innovative financing, procurement, and construction techniques, including design-build turnkey applications.

This measure provides local agencies with an opportunity to add or emphasize additional factors consistent with local priorities and actions relevant to the success of the New Starts transit investment. No specific reporting format is required for the submission of optional criteria. Local agencies are encouraged to highlight other factors in a well organized, brief statement.

3.6 Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns

FTA staff, with assistance from designated contractors, gather and review summary information, supporting documentation, and quantitative data prepared by local agencies to assess the **existing land use, transit supportive land use policies, and future patterns** associated with proposed New Starts projects. This guidance is intended to assist local agencies in the preparation and submission of the materials that FTA uses to assess and rate a proposed project's transit supportive land use.

3.6.1 Summary of Changes in the Reporting Instructions from Previous Years

The land use section of the *Reporting Instructions* has been revised consistent with the Major Capital Investment Projects Final Rule, which took effect April 6th, 2001⁹. Under the new rule, the name of the transit supportive land use criterion has been changed from “Transit Supportive Existing Land Use Policies and Future Patterns” to “Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns,” to more accurately reflect FTA’s practices in evaluating land use issues relating to proposed New Starts projects.

One major change to the land use criterion is that the six land use factors have been combined into three primary rating categories, plus a fourth optional category, Other Land Use Considerations. The *FY 2003 Annual Report on New Starts* will report ratings for each of the three primary rating categories. Each rating category also has one or more associated factors that are considered in developing an overall land use rating. The categories and factors (shown in Figure 3-1) are:

⁹ 49 CFR Part 611; Federal Register Vol. 65 No. 236, Thursday, December 7th, 2001.

- **Existing Land Use** – Includes one factor, “Existing Land Use,” similar to previous years.
- **Transit Supportive Plans and Policies** – Includes the following factors from previous years:
 - “Growth Management” (previously referred to as “Containment of Sprawl”);
 - Transit Supportive Corridor Policies;
 - Supportive Zoning Regulations Near Transit Stations; and
 - Tools to Implement Land Use Policies.
- **Performance and Impacts of Policies** – Includes the following factors:
 - Performance of Land Use Policies (similar to previous years); and
 - Potential Impact of Transit Project on Regional Land Use (a new factor introduced in the
- **Other Land Use Considerations (optional)** – Similar to the previous factor “Other Land Use Considerations (optional).”

Figure 3-1: Land Use Rating Categories and Factors

<table><tr><td>I. Existing Land Use</td></tr><tr><td>a. Existing Land Use</td></tr></table>	I. Existing Land Use	a. Existing Land Use	<table><tr><td>III. Performance and Impacts of Policies</td></tr><tr><td>a. Performance of Land Use Policies</td></tr><tr><td>b. Potential Impact of Transit Project on Regional Land Use</td></tr></table>	III. Performance and Impacts of Policies	a. Performance of Land Use Policies	b. Potential Impact of Transit Project on Regional Land Use							
I. Existing Land Use													
a. Existing Land Use													
III. Performance and Impacts of Policies													
a. Performance of Land Use Policies													
b. Potential Impact of Transit Project on Regional Land Use													
<table><tr><td>II. Transit Supportive Plans and Policies</td></tr><tr><td>a. Growth Management</td></tr><tr><td>b. Transit Supportive Corridor Policies</td></tr><tr><td>c. Supportive Zoning Regulations Near Transit Stations</td></tr><tr><td>d. Tools to Implement Land Use Policies</td></tr></table>	II. Transit Supportive Plans and Policies	a. Growth Management	b. Transit Supportive Corridor Policies	c. Supportive Zoning Regulations Near Transit Stations	d. Tools to Implement Land Use Policies	<table><tr><td>IV. Other Land Use Considerations</td></tr><tr><td>Exceptional examples, e.g.:</td></tr><tr><td>• Historic</td></tr><tr><td>• Environmental</td></tr><tr><td>• Community preservation</td></tr><tr><td>• Brownfields redevelopment</td></tr><tr><td>• Designated Federal Enterprise Zone/Empowerment Community</td></tr></table>	IV. Other Land Use Considerations	Exceptional examples, e.g.:	• Historic	• Environmental	• Community preservation	• Brownfields redevelopment	• Designated Federal Enterprise Zone/Empowerment Community
II. Transit Supportive Plans and Policies													
a. Growth Management													
b. Transit Supportive Corridor Policies													
c. Supportive Zoning Regulations Near Transit Stations													
d. Tools to Implement Land Use Policies													
IV. Other Land Use Considerations													
Exceptional examples, e.g.:													
• Historic													
• Environmental													
• Community preservation													
• Brownfields redevelopment													
• Designated Federal Enterprise Zone/Empowerment Community													

These new rating categories reflect two significant changes and additions consistent with the Final Rule (effective in April 2001):

- The factor previously known as "Containment of Sprawl" is now redefined as "Growth Management" to better reflect the wide range of strategies to manage regional growth and to support increased development around transit investments.
- A new factor, "Potential Impact of Transit Investment on Regional Land Use," explicitly addresses the potential impact of the proposed project on regional growth and development patterns. This factor is incorporated into the rating category, "Performance and Impacts of Policies."

Similar to previous years, each of the factors also has associated "supporting factors" (previously called "subfactors"). These supporting factors are considered individually in developing overall category ratings, and are used to help project sponsors structure the information which they submit. For the most part, the supporting factors are the same as in previous years. Some notable exceptions include:

- Consistent with the Final Rule, provisions for pedestrian access, including access for persons with disabilities, are explicitly identified as a supporting factor for three factors: "Existing Land Use," "Transit Supportive Corridor Policies," and "Performance of Land Use Policies."
- The factor "Tools to Implement Land Use Policies" has been reorganized to include the following supporting factors:
 - Outreach to government agencies and the community in support of land use planning;
 - Regulatory and financial incentives to promote transit supportive development; and
 - Efforts to engage the development community in station area planning and transit supportive development.
- The factor "Performance of Land Use Policies" no longer includes the supporting factor "corridor development targets." This supporting factor is now considered indirectly through other factors, including "Transit Supportive Corridor Policies" and "Potential Impact of Transit Investment on Regional Land Use."
- The new factor, "Potential Impact of Transit Investment on Regional Land Use," includes the following two supporting factors:
 - Adaptability of land for development; and
 - Corridor economic environment.

The changes to the rating categories for FY 2003 reflect the desire to more clearly distinguish among three primary aspects of land use – existing land use patterns, plans and policies, and expected impacts. In addition, the revisions to the supporting factors should further clarify and help structure the information that is desired of project sponsors in their submissions.

3.6.2 FTA's Assessment Process for the Existing Land Use, Transit Supportive Land Use Policies, And Future Patterns Criterion

3.6.2.1 Land Use Rating Categories

Using the information provided by local agencies, FTA and its contractors conduct land use assessments on proposed New Starts projects in preliminary engineering or final design. These assessments focus on the following four categories that FTA uses to measure the degree of transit supportive land use:

- Existing Land Use;
- Transit Supportive Plans and Policies;
- Performance and Impacts of Policies; and
- Other Land Use Considerations (optional).

The “Other Land Use Considerations” category reflects transit supportive land use conditions and circumstances otherwise not addressed by the three primary rating factors. Examples may include unique project purpose, exceptional examples of historical, environmental or community preservation and enhancement, topography, Brownfields redevelopment, central city redevelopment, designation as a Federal Enterprise Zone/Empowerment Community, type and condition of market (e.g., resort, seasonal), intermodal connections, or other factors.

FTA has also developed two or more supporting factors related to each category and factor. Table 3-8 shows the supporting factors for each of the rating categories. Table 3-9 provides guidance on the type of information and supporting documentation that should be provided for each supporting factor.

3.6.3 *Information and Data Sources for Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns*

In general, local agencies are not expected to generate additional analyses, documents, or quantitative data addressing land use issues in order to satisfy the reporting requirement for the *Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns* criterion. In most instances, agencies will be able to rely on readily available materials that have been prepared in conjunction with other studies and analyses.

3.6.3.1 Information and Supporting Documentation

Local agencies, municipalities, regional planning and governmental agencies, neighborhood organizations, and the private sector prepare information and documents useful for meeting the reporting requirements for the New Starts land use criterion. These materials are developed routinely in conjunction with local and regional land use plans, livable communities initiatives, and economic development activities, as well as in feasibility studies, alternatives analyses, major investment studies (MISs), corridor studies, environmental analyses, and other planning efforts for transit New Starts investments.

To assist the development of accurate project ratings, FTA requests agencies to submit full or relevant portions, as appropriate, of corridor and station area maps, local comprehensive plans and zoning ordinances, local and regional policies and agreements regarding land use planning, documentation of station area planning efforts, and documentation of other tools, incentives, and programs affecting corridor and station area land use. Additional descriptions of the information requested for the Existing Land Use, Transit Supportive Land Use Plans, and Future Patterns criterion are provided in Table 3-9.

3.6.3.2 Quantitative Data

Quantitative data on population and employment served by a proposed New Starts project are critical inputs to the assessment of existing and future land use conditions. Key indicators include total employment in the Central Business District (CBD) and served by the system as a whole, as well as population and employment densities in the corridor and in station areas. Template 12 is the Quantitative Data Reporting Format. Appendix B provides a sample methodology for estimating station area population, households, and employment. Agencies are

requested to follow this methodology in order to ensure consistent reporting of quantitative data among New Starts applicants.

FTA recognizes that some agencies may have to utilize additional data sources, beyond those described above, to provide the quantitative data requested in Template 12. Likely sources are additional reports and data from the Census, MPOs, and local planning agencies. FTA intends to use these data to arrive at a more complete understanding of proposed projects and to develop more thorough information about population and employment densities and development forecasts and proposals. It is hoped that, in cases where agencies have not prepared these data previously, the development of this information will be as useful for agency planning and analysis as it is for FTA's New Starts project review.

3.6.4 Reporting Method

Upon request from FTA, local agencies will submit written summaries and supporting materials to contractors employed by FTA to assist in information gathering during the New Starts review process. Information on the *Existing Land Use, Transit Supportive Land Use Plans, and Future Patterns* criterion should be organized as follows:

- Table of Contents
- Project Description
- Map(s)
- Summary Information, Referencing Supporting Documentation (Template 11)
- Quantitative Data (Template 12)
- Supporting Documentation

The materials to be submitted and the reporting process are discussed further below.

3.6.4.1 Table of Contents

Local agencies should provide a Table of Contents at the beginning of their submission, summarizing all provided materials.

3.6.4.2 Project Description

Applicants are required to submit the Project Description worksheet (Template 1) as part of their full New Starts application. Applicants should include a copy of this worksheet with their land use submittal.

3.6.4.3 Maps

A project map (or maps) should be submitted that clearly indicates the location of the project and all stations, with reference to 1) the major highway network; 2) other major transit connections; 3) the CBD and other major activity centers; 4) boundaries of local jurisdictions; and 5) boundaries of the project study corridor.

3.6.4.4 Summary Information (Qualitative Data)

Template 11 is the reporting format for providing summary qualitative information on each of rating categories: (1) Existing Land Use; (2) Transit Supportive Land Use Plans and Policies; (3) Performance and Impacts of Policies; and (4) Other Land Use Considerations (optional). Template 11 appears in Appendix A of these *Reporting Instructions*, which contains the reporting templates for all of the New Starts criteria and their respective measures.

Template 11 allows local agencies to provide written statements to highlight or expand upon information for specific factors. Local agencies may also provide specific references to existing

maps, plans, or other documentation attached with the submittal that address the specific factor and type of information requested by FTA.

Table 3-8 provides a brief outline of the supporting factors that FTA uses to assess each of the rating categories associated with the land use criterion. Table 3-9 provides guidance on the information and supporting documentation that local agencies should provide for each supporting factor.

3.6.4.5 Quantitative Data

Template 12 is the reporting format for Quantitative Data. The objective of gathering these data is to present base year and forecast year information about population, housing units, and employment associated with the project. These subjects are addressed in various combinations at the metropolitan, CBD, corridor, and station area levels. Template 12 appears in Appendix A of these *Reporting Instructions*.

Appendix B provides a sample methodology for estimating station area population, households, and employment. This guidance is intended to assist local agencies with providing quantitative data at the station area level in a uniform manner.

3.6.4.6 Supporting Documentation

Agencies should provide full or relevant portions of supporting documentation referenced in their submission. Some particularly helpful pieces of supporting documentation are described below.

Visual aids (maps, photographs, and illustrations) – The characteristics of existing land use, as well as planned future development, can be most readily communicated through information that is visual or graphical in nature. Some recommended types of visual and graphical information to include with the submission are:

- Maps of station areas showing the street network, existing land uses, planned land uses, and zoning;
- Aerial and ground-level photographs of station areas;
- Maps showing existing and forecast population and employment densities in the corridor; and
- Photographs or illustrations of existing transit supportive station area development that has taken place around any existing transit stations or corridors in the region.

Planning documents – Land use plans, policies, and reports developed by local and regional agencies represent a key source of information on the potential for future transit supportive development. Some examples from which to provide either full documents or relevant excerpts include:

- Regional growth management policies and agreements;
- Local comprehensive plans, small-area or station area plans, zoning ordinances, and design guidelines relevant to station areas;
- Station area planning documents (conceptual plans, land inventories, market studies);
- Analysis of land development trends and market potential for transit supportive development within the region and station areas;
- Descriptions of the corridor and station area physical environment from environmental review documents;
- Descriptions of other tools and incentives available for influencing development; and
- Site plans or descriptions of station area development proposals.

3.6.5 *Guidance for Agencies That Have Submitted Materials Previously*

Agencies that fully reported land use assessment information for a recent preliminary engineering or final design approval or for a previous *New Starts Report*, need only provide information that reflects changes since the most recent submission. Unless indicated to the applicant by FTA, prior year submissions remain available in FTA's files. **New documents or other materials not previously submitted to FTA, or information that was incomplete or unavailable in prior year submissions, should be reported and highlighted.**

Agencies that submitted data for a previous approval or New Starts report prior to the release of these updated Reporting Instructions, should update their submittals to address the additional factors identified in the New Starts Final Rule and discussed in these instructions.

3.6.6 *Importance of Organized, Comprehensive Submittal*

It is important for local agencies to consider that "high," "medium-high," "medium," "low-medium," or "low" ratings assigned to the land use measurement factors by FTA will be directly related to the ability of FTA and its reviewers to readily identify, locate, review, and assess locally provided documentation. A well organized submittal is to the advantage of the local agency.

3.6.7 *Additional Guidance*

Following are several suggestions for improving agency submissions of information for the *Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns* criterion:

- Project sponsors should provide documentation to substantiate qualitative information rather than rely solely upon reference;
- Sponsors should provide detailed documentation and maps, including approved policies and plans, market studies and economic analyses, etc.;
- To the extent possible, sponsors should quantify data, e.g., density, employment, trip generators, etc.;
- Submissions should be brief and precise, but thorough, in providing explanatory statements; important information should not be omitted for the sake of brevity;
- Submissions should provide an explanation of the impact of transit supportive land use policies and how implementation would be achieved, particularly when significant changes are anticipated;
- Submissions should distinguish between existing conditions and those expected from the implementation of land use policies and development practices;
- Submissions should distinguish between station area, corridor, municipal, and regional transit supportive policies and plans;
- Information submitted should identify the mix of land uses within the corridor;
- Submissions should address parking policies and pricing strategies;
- Sponsors are strongly encouraged to present land use information in the format established in these *Reporting Instructions*.
- Sponsors may wish to review the *Assessment of Transit Supportive Land Use for New Starts Projects* published as a supplement to the FY 1999, FY 2000, and FY 2002 *New Starts Reports*; these reports summarize and analyze the transit supportive land use associated with

New Starts projects, individually and cumulatively, and provide insights on FTA's land use evaluation and rating process.

In addition, project sponsors are reminded of the importance of providing FTA adequate time to evaluate and rate each project's existing land use, transit supportive land use policies, and future patterns. Please comply with the **specified timeframe** for submitting information, and with the **mailing directions** indicating to whom the various materials are to be submitted.

Table 3-8: Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Supporting Factors for Each Land Use Rating Category

Land Use Rating Category	Supporting Factors
I. EXISTING LAND USE	
	<ul style="list-style-type: none"> Existing corridor and station area development Existing corridor and station area development character Existing station area pedestrian facilities, including access for persons with disabilities Existing corridor and station area parking supply
II. TRANSIT SUPPORTIVE PLANS AND POLICIES	
a. Growth Management	<ul style="list-style-type: none"> Concentration of development around established activity centers and regional transit Land conservation and management
b. Transit Supportive Corridor Policies	<ul style="list-style-type: none"> Plans and policies to increase corridor and station area development Plans and policies to enhance transit-friendly character of corridor and station area development Plans to improve pedestrian facilities, including facilities for persons with disabilities Parking policies
c. Supportive Zoning Regulations Near Transit Stations	<ul style="list-style-type: none"> Zoning ordinances that support increased development density in transit station areas Zoning ordinances that enhance transit-oriented character of station area development and pedestrian access Zoning allowances for reduced parking and traffic mitigation
d. Tools to Implement Land Use Policies	<ul style="list-style-type: none"> Outreach to government agencies and the community in support of land use planning Regulatory and financial incentives to promote transit supportive development Efforts to engage the development community in station area planning and transit supportive development
III. PERFORMANCE AND IMPACTS OF POLICIES	
a. Performance of Land Use Policies	<ul style="list-style-type: none"> Demonstrated cases of development affected by transit supportive policies Station area development proposals and status
b. Potential Impact of Transit Investment on Regional Land Use	<ul style="list-style-type: none"> Adaptability of station area land for development Corridor economic environment
IV. OTHER LAND USE CONSIDERATIONS (Optional)	
Exceptional Examples	<ul style="list-style-type: none"> Historic Environmental Community preservation

Table 3-9: Assessment of Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Documentation Supporting Land Use Criterion
I. EXISTING LAND USE	
Existing corridor and station area development (population, employment, high trip generators)	<ul style="list-style-type: none"> Corridor and station area population, housing units, and employment (provide information in template form, Template 12) Listing and description of high trip generators (examples include colleges/universities, stadiums/arenas, hospitals/medical centers, shopping centers, performing arts centers, and other significant trip generators)
Existing station area development character	<ul style="list-style-type: none"> Description of character of existing land use mix and pedestrian environment in corridor and station areas Station area maps with uses and building footprints shown Ground-level or aerial photographs of station areas
Existing station area pedestrian facilities, including access for persons with disabilities	<ul style="list-style-type: none"> Station area maps identifying pedestrian facilities and access provisions for persons with disabilities Documentation of achievement of curb ramp transition plans and milestones required under CFR 35.150(d)(2)
Existing corridor and station area parking supply	<ul style="list-style-type: none"> Existing parking spaces per square footage of commercial development and/or per dwelling unit Parking spaces per employee in the CBD and/or other major employment centers Land area within ½ mile of station devoted to parking Average daily parking cost in the CBD and/or other areas
II. TRANSIT SUPPORTIVE PLANS AND POLICIES	
a. Growth Management	
Concentration of development around established activity centers and regional transit	<ul style="list-style-type: none"> Regional plans or policies that promote increased development, infill development, and redevelopment in established urban centers and activity centers, and/or limit development away from primary activity centers Regional plans or policies to concentrate development around major transit facilities Local comprehensive plans or capital improvement plans that give priority to infill development and/or provide for opportunities for high density redevelopment
Land conservation and management	<ul style="list-style-type: none"> Growth management plans (e.g. growth management areas, urban growth boundaries, agricultural preservation plans, open space preservation plans) with maps Policies that allow for transfer of development rights from open space or agricultural land to urban areas
II. TRANSIT SUPPORTIVE PLANS AND POLICIES (continued)	
b. Transit Supportive Corridor Policies	
Plans and policies to increase corridor and station area development	<ul style="list-style-type: none"> Adopted city, county, and regional plans and policies and private sector plans and initiatives that promote development in the transit corridor and station areas;

Table 3-9: Assessment of Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Documentation Supporting Land Use Criterion
	<p>plans may include general plans, specific plans (subarea, station area, etc.), redevelopment project plans, or other district plans</p> <ul style="list-style-type: none"> • Examples of transit supportive policies include: general policy statements in support of transit as a principal mode of transportation within the corridor; policies that support and promote the use of transit; policies/plans that provide for high density development within the corridor and station areas; and policies that support changes to zoning within the corridor and station areas
Plans and policies to enhance transit-friendly character of station area development	<ul style="list-style-type: none"> • Elements of adopted city, county, and regional plans and policies that promote transit-friendly character of corridor and station area development • Policies to promote mixed-use projects • Policies to promote housing and transit-oriented retail • Policies that allow/promote vertical zoning within the corridor • Façade improvement programs • Funds to support transit-oriented plans • Private sector plans and initiatives consistent with the public plans and policies listed above
Plans to develop pedestrian facilities and enhance disabled access	<ul style="list-style-type: none"> • Requirements and policies for sidewalks, connected street or walkway networks, and other pedestrian facility development plans for station areas • Capital improvement programs to enhance pedestrian-friendly design in station areas • Curb ramp transition plans and milestones required under CFR 35.150(d)(2), and other plans for retrofitting existing pedestrian infrastructure to accommodate persons with disabilities in station areas • Street design guidelines or manuals addressing pedestrian and transit-oriented street design (lighting, street furniture, sidewalk width, etc.)
Parking policies (allowances for reductions in parking requirements and traffic mitigation requirements for development near station areas, plans for park-and-ride lots, parking management)	<ul style="list-style-type: none"> • Policies to reduce parking requirements or cap parking in station areas • Policies establishing maximum allowable parking for new development in areas served by transit • Shared parking allowances • Mandatory minimum cost for parking in areas served by transit • Parking taxes
II. TRANSIT SUPPORTIVE PLANS AND POLICIES (continued) c. Supportive Zoning Regulations Near Transit Stations	
Zoning ordinances that support increased development density in transit station areas	<ul style="list-style-type: none"> • Ordinances and maps describing existing zoning (allowable uses and densities) • Recent changes to zoning ordinances to allow or encourage development with transit supportive densities and uses

Table 3-9: Assessment of Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Documentation Supporting Land Use Criterion
	<ul style="list-style-type: none"> • Transit overlay zoning • Zoning incentives for increased development in station areas (density bonuses, housing fund subsidies, regulation relaxation, expedited zoning review, etc.)
Zoning ordinances that enhance transit-oriented character of station area development and pedestrian access	<ul style="list-style-type: none"> • Zoning regulations that allow mixed-use development • Zoning regulations addressing placement of building footprints, pedestrian facilities, façade treatments, etc. • Architectural design guidelines and mechanisms for implementation/enforcement of these guidelines
Zoning allowances for reduced parking	<ul style="list-style-type: none"> • Residential and commercial parking requirements (minimums and/or maximums) in station areas under existing zoning • Zoning ordinances providing reduced parking requirements for development near transit stations
II. TRANSIT SUPPORTIVE PLANS AND POLICIES (continued) d. Tools to Implement Land Use Policies	
Outreach to government agencies and the community in support of land use planning	<ul style="list-style-type: none"> • Promotion and outreach activities by the transit agency, local jurisdictions, and/or regional agencies in support of station area planning, growth management, and transit-oriented development • Inter-local agreements, resolutions, or letters of endorsement from other government agencies in support of coordinating land use planning with transit investment • Actions of other groups, including Chambers of Commerce, professional development groups, citizen coalitions, as well as the private/commercial sector, in support of transit-oriented development practices • Public outreach materials and brochures
Regulatory and financial incentives to promote transit-supportive development	<ul style="list-style-type: none"> • Regulatory incentives (e.g., density bonuses, streamlined processing of development applications) for developments near transit • Zoning requirements for traffic mitigation (e.g., fees and in-kind contributions) and citations of how such requirements can be waived or reduced for locations near transit stations • Programs that promote or provide incentives for transit-oriented development such as tax increment financing zones, tax abatement programs, and transit-oriented loan support programs • Other economic development and revitalization strategies for station areas or within the corridor
Efforts to engage the development community in station-area planning and transit-supportive development	<ul style="list-style-type: none"> • Outreach, education, and involvement activities targeted at the development community (including developers, property owners, and financial institutions) • Transit-oriented market studies • Joint development programs and proposals

Table 3-9: Assessment of Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Documentation Supporting Land Use Criterion
	<ul style="list-style-type: none"> Letters of endorsement or other indicators of support from the local development community
Public involvement in corridor and station area planning	<ul style="list-style-type: none"> Description of public involvement process, including corridor and station area land use planning activities Description of the level of participation in land use planning activities and support for these activities by the general public and community groups Public outreach materials and brochures
III. PERFORMANCE AND IMPACTS OF LAND USE POLICIES a. Performance of Land Use Policies	
Demonstrated cases of developments affected by transit supportive policies	<ul style="list-style-type: none"> Documentation of projects that have recently been built consistent with transit-oriented design principles (higher density, orientation toward street, provision of pedestrian access from transit, etc.) Documentation of projects that incorporate a mix of uses or increased amounts of housing
Station area development proposals and status	<ul style="list-style-type: none"> Descriptions and plans for new development, including joint development proposals, including size, types of uses, and expected dates of start of construction and completion
III. PERFORMANCE AND IMPACTS OF LAND USE POLICIES (continued) b. Potential Impact of Transit Project on Regional Land Use	
Adaptability of station area land for development	<ul style="list-style-type: none"> Description or inventory of land near transit stations that is vacant or available for redevelopment, and amount of development anticipated for these parcels Projected timeline for development of station area properties Amount of development allowed at station area build-out compared to existing amount of development
Corridor economic environment	<ul style="list-style-type: none"> Regional and corridor economic conditions and growth projections Development market trends in existing corridors and station areas (for areas with existing transit) Demonstrated market support for higher-density and transit/pedestrian-oriented development Locations of major employment centers in the region, and expected growth in these centers Projected population, employment, and growth rates in corridor or station areas compared to region
IV. OTHER LAND USE CONSIDERATIONS (Optional)	
Other unidentified or unusual circumstances, conditions, or constraints under which the transit agency operates and which influence	<p>Examples may include:</p> <ul style="list-style-type: none"> Unique project purpose Exceptional examples of historical, environmental or community preservation and enhancement

Table 3-9: Assessment of Existing Land Use, Transit Supportive Land Use Policies, and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Documentation Supporting Land Use Criterion
local and regional land use policies, plans, and implementation	<ul style="list-style-type: none">• Topography• Brownfields redevelopment• Central city redevelopment• Designation as a Federal Enterprise Zone/Empowerment Community• Type and condition of market (e.g., resort, seasonal)• Intermodal connections• Other factors